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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,674	07/02/2003	Ming-Chang Shih		7321

7590 10/19/2005
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EXAMINER

CHANG, SUNRAY

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/614,674		SHIH ET AL.	
	Examiner		Art Unit	
	Sunray Chang		2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1 – 4 are presented for examination.

Claims 1 – 4 are rejected.

Pro se

2. An examination of this application reveals that applicant is unfamiliar with patent prosecution procedure. While an inventor may prosecute the application, lack of skill in this field usually acts as a liability in affording the maximum protection for the invention disclosed. Applicant is advised to secure the services of a registered patent attorney or agent to prosecute the application, since the value of a patent is largely dependent upon skilled preparation and prosecution. The Office cannot aid in selecting an attorney or agent.

A listing of registered patent attorneys and agents is available on the USPTO Internet web site <http://www.uspto.gov> in the Site Index under “Attorney and Agent Roster.” Applicants may also obtain a list of registered patent attorneys and agents located in their area by writing to the Mail Stop OED, Director of the U. S. Patent and Trademark Office, PO Box 1450, Alexandria, VA 22313-1450

Claim Objections

3. Claims 2 and 3 are objected to because of the following informalities: The terms “LVDT” in claim 2, “PWM signal” in claim 3, have not been defined in claims or specification. The term, “LVDT”, has been interpreted to as “Linear Variable Differential Transformer”

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hereinafter. The term, "PWM signal" has been interpreted to as "pulse-width-modulated signal" hereinafter.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the **first paragraph of 35 U.S.C. 112**:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.**

Specifically, dependent claim 3 includes limitations drawn to "compensation method" means. But the specification does not disclose the methodology for actually how to make decisions for "the waveform", "the frequency", "the amount of offset", "the amplitude", "the slop" and "the largest amplitude". No algorithms, techniques or flow charts are disclosed. Applicant's specification appears to be drawn entirely to procedures of comparing the feedback signals with the original commands to get an error. Applicants have not disclosed specifically how to make decisions for "the waveform", "the frequency", "the amount of offset", "the amplitude", "the slop" and "the largest amplitude". Accordingly, a skilled artisan would not

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know how to make and/or use the claimed invention from the written description contained in the specification. Dependent claims inherit this defect.

5. **Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.**

Specifically, dependent claim 4 includes limitations drawn to “compensation method” means. But the specification does not disclose the methodology for actually how to “make judgment of the velocity being smaller than the critical velocity or not” and “the judgment of the error being larger or smaller than zero”. No algorithms, techniques or flow charts are disclosed. Applicant’s specification appears to be drawn entirely to procedures of comparing the feedback signals with the original commands to get an error. Applicants have not disclosed specifically how to “make judgment of the velocity being smaller than the critical velocity or not” and “the judgment of the error being larger or smaller than zero”. Accordingly, a skilled artisan would not know how to make and/or use the claimed invention from the written description contained in the specification. Dependent claims inherit this defect.

The following is a quotation of the **second paragraph of 35 U.S.C. 112**:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. **Claims 2 and 3 are rejected** as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph.

The claim(s) are narrative in form and replete with indefinite and functional or operational language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. The claim(s) must be in one sentence form only. Note the format of the claims in the patent(s) cited.

For example, in claim 2, “an ordinary LVDT and resistance scales don’t have the resolution of the micro-nanometer level”, in claim 4, “the judgment of the velocity being smaller than the critical velocity or not, are negative language involved claim descriptions; Yet, the terms, “LVDT” and “PWM”, have not been clearly defined in specification.

Claim Interpretations

7. The term, “micro-nanometer level”, has been interpreted to as “nanometer-level accuracy” hereinafter, based on the definition of specification (page 5, Line 10): “micro-nanometer class (1 um, 1 nm, 20nm resolution)”

In claim 2, “a servo valve is also able to be replaced by a proportional valve” has been interpreted to as “a servo valve or a proportional valve” hereinafter.

The compensation method in claim 3 has been interpreted as a compensation strategy hereinafter, according to 112 first, failure of enablement.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. **Claims 1 – 4 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Shinji Wakui (U.S. Patent No. 6,286,644 and referred to as **Wakui_644** hereinafter), and in view of Shinji Wakui et al. (U.S. Patent No. 6,170,622 and referred to as **Wakui_622** hereinafter).

(**Wakui_644** as set forth above generally discloses the basic invention.)

Regarding independent claim 1,

Wakui_644 teaches,

- A design and control method of a precision servo pneumatic X-Y positioning table [Fig. 1 – 11 & Abstract] comprising:
- a design of the precision servo pneumatic X-Y positioning table; [Fig. 7]

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- a compensation method of the velocity compensation signal used [a signal obtained by suitably compensating for the output of a velocity sensor] on the positioning control of the pneumatic cylinder [air spring], [Col. 6, Lines 14 – 32]and
- a process of the positioning control method. [the strategy, Col. 6, Lines 32 – 39; see also Col. 6, Lines 39 – 62]

Further official notice, Karp et al. (U.S. Patent No. 4,257,146) teaches, “pneumatic cylinder functions as an air spring” [Col. 5, Lines 30 – 35] cited by examiner for defining “pneumatic cylinder” in claims.

Wakui_644 does not teach a micro-nanometer precision limitation.

Wakui_622 teaches the micro-nanometer precision limitation [nanometer-level accuracy, Col. 3, Line 32], for the purpose of accuracy requirement.

It would have been obvious to a person of ordinary skill in the art at the time of applicant’s invention to modify the teaching of **Wakui_644** to include a “micro-nanometer precision” limitation, for the purpose of accuracy requirement.

Regarding dependent claim 2,

Wakui_644 teaches,

- two slide air cylinders drive the table; [air spring actuator, Fig. 7 and Abstract]
- a positioning sensor [measures the position] optical [laser] scale is used to send back the position signal [amount of movement];

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- an ordinary LVDT and resistance scales don't have the resolution of the micro-nanometer level, and a servo valve is also able to be replaced by a proportional valve. [air spring, PI] [Col. 15, Lines 27 – 54]

Wakui_644 does not teach a micro-nanometer precision limitation.

Wakui_622 teaches the micro-nanometer precision limitation [nanometer-level accuracy, Col. 3, Line 32], for the purpose of accuracy requirement.

It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of **Wakui_644** to include a "micro-nanometer precision" limitation, for the purpose of accuracy requirement.

Regarding dependent claim 3,

Wakui_644 teaches,

- the decision of the waveform and the frequency of the velocity compensation signal, the frequency of the velocity compensation signal being larger than the system's natural frequency, and the waveform being the absolute value of sinusoidal wave signal and is able to be replaced by the square wave signal; the decision of the amount of offset (A) of the velocity compensation signal depended on the characteristic curve of the servo valve; the value "a" of the positive dead zone of the servo valve being the positive offset of the velocity compensation signal, and the value "-b" of the negative dead zone of the servo valve being the negative offset of the velocity compensation signal; the decision of the amplitude (B) of the velocity compensation signal depended on the characteristic curve of the velocity and the friction force of the pneumatic cylinder with low velocity; the slope of the curve of the

friction force of the pneumatic cylinder with low velocity making the amplitude in inverse proportion to the velocity; the decision of the largest amplitude of the velocity compensation signal depended on the largest friction force of the pneumatic cylinder; subtracting the value of the dead zone of the servo valve from the value of the smallest voltage of the pneumatic cylinder's slide and get the value of the largest amplitude, and the velocity compensation signal being able to be used with servo valve control, besides, with proportion electromagnetic valve control or with high speed solenoid valve PWM control signal.

[Wakui_644 teaches a strategy in Col. 6, Lines 32 – 39, see also Col. 39 – 62, Col. 7 – Col. 17]

Regarding dependent claim 4,

Wakui_644 teaches,

- the judgment of the velocity being smaller than the critical velocity (V_c) or not, and decided to compensate or not, and the judgment of the error being larger or smaller than zero, and decided to compensate the positive compensation or the negative compensation. [feedback, Col. 3, Lines 59 – Col. 4, Line 15]

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schukar et al. (U.S. Patent No. 6,740,131) discloses an apparatus and method provided for automated positioning to a desired orientation to facilitate subsequent processing. Morelock et al. (U.S. Patent No. 4,082,129) discloses pneumatic cylinders which both actuate

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positioning mechanisms and act as air spring. Haga et al. (U.S. Patent No. 5,876,012) discloses a vibration cancellation apparatus. Van Engelen et al. (U.S. Patent No. 5,953,105) discloses a positioning device and a lithographic device provided with such a positioning device. Pyötsiä et al. (U.S. Patent No. 6,546,295) discloses a PID controller, a process variable feedback, an optimal control loop performance, a control valve, a tuning system and a comparison. Higuchi et al. (U.S. Patent No. 6,510,755) discloses a XY stage, and an air slide.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sunray Chang whose telephone number is (571) 272-3682. The examiner can normally be reached on M-F 7:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on (571) 272-3687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-746-3506.

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October 17, 2005



Anthony Knight
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